

Claims

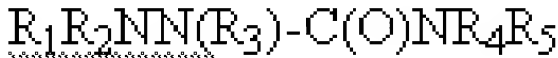
[c1] An aqueous acid composition comprising

- (a) an aqueous acid;
- (b) a polymeric gelling agent that crosslinks in the presence of ferric ions at a pH of about 2 or greater;
- (c) a soluble ferric salt in an amount sufficient to crosslink said polymeric gelling agent at a pH of about 2 or greater, but which does not crosslink said polymeric gelling agent at a pH below about 2; and
- (d) an effective amount of a source of a reducing agent selected from the group consisting of hydroxylamine and a hydrazine.

[c2] The composition of claim 1 wherein the source of the hydrazine is selected from the group consisting of carbohydrazides having the formula



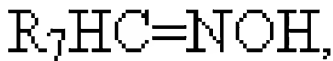
and semicarbohydrazides having the formula



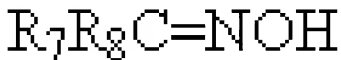
wherein R_1 through R_6 may be the same or different and

may be hydrogen or a branched, cyclic, or straight chained, saturated or unsaturated hydrocarbon having from 1 to about 6 carbon atoms.

- [c3] The composition of claim 2 wherein the carbohydrazide is carbohydrazide wherein R_1 through R_6 are each hydrogen.
- [c4] The composition of claim 2 wherein the semicarbohydrazide is semicarbohydrazide wherein R_1 through R_5 are each hydrogen.
- [c5] The composition of claim 1 wherein the source of the hydroxylamine is selected from the group consisting of a aldoximes having the formula



and ketoximes having the formula



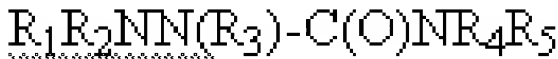
wherein R_7 and R_8 may be the same or different and may be a branched, cyclic, or straight chained, saturated or unsaturated hydrocarbon having from 1 to about 8 carbon atoms and further wherein R_7 and R_8 may form a ring.

- [c6] The composition of claim 5 wherein the source of the hydroxylamine is selected from the group consisting of 2-butanone oxime, methyl isobutyl ketoxime, cyclohexanone oxime, acetaldoxime, butyraldoxime, propionaldoxime, heptaldoxime, 3-heptanone oxime, and acetophenone oxime.
- [c7] The composition of claim 6 wherein the source of the hydroxylamine is 2-butanone oxime.
- [c8] A method of acidizing a subterranean formation penetrated by a wellbore comprising the step of injecting into said formation through said wellbore a fluid comprising
- (a) an aqueous acid;
 - (b) a polymeric gelling agent that crosslinks in the presence of ferric ions at a pH of about 2 or greater;
 - (c) a soluble ferric salt in an amount sufficient to crosslink said polymeric gelling agent at a pH of about 2 or greater, but which does not crosslink said polymeric gelling agent at a pH below about 2; and
 - (d) an effective amount of a source of a reducing agent selected from the group consisting of hydroxylamine and a hydrazine.
- [c9] The method of claim 8 wherein the source of the hydrazine is selected from the group consisting of carbo-

hydrazides having the formula



and semicarbohydrazides having the formula

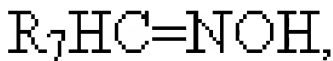


wherein R_1 through R_6 may be the same or different and may be hydrogen or a branched, cyclic, or straight chained, saturated or unsaturated hydrocarbon having from 1 to about 6 carbon atoms.

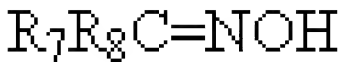
[c10] The method of claim 9 wherein the carbohydrazide is carbohydrazide wherein R_1 through R_6 are each hydrogen.

[c11] The method of claim 9 wherein the semicarbohydrazide is semicarbohydrazide wherein R_1 through R_5 are each hydrogen.

[c12] The method of claim 8 wherein the source of the hydroxylamine is selected from the group consisting of a aldoximes having the formula



and ketoximes having the formula

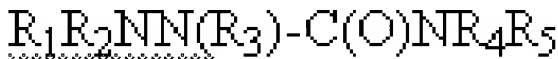


wherein R_7 and R_8 may be the same or different and may be a branched, cyclic, or straight chained, saturated or unsaturated hydrocarbon having from 1 to about 8 carbon atoms and further wherein R_7 and R_8 may form a ring.

- [c13] The method of claim 12 wherein the source of the hydroxylamine is selected from the group consisting of 2-butanone oxime, methyl isobutyl ketoxime, cyclohexanone oxime, acetaldoxime, butyraldoxime, propionaldoxime, heptaldoxime, 3-heptanone oxime, and acetophenone oxime.
- [c14] The method of claim 13 wherein the source of the hydroxylamine is 2-butanone oxime.
- [c15] The method of claim 8 wherein the step of injecting into said formation through said wellbore is conducted at a pressure and flow rate sufficient to create a fracture in said formation.
- [c16] The method of claim 15 wherein the source of the hydrazine is selected from the group consisting of carbonylhydrazides having the formula



and semicarbohydrazides having the formula

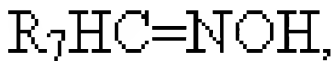


wherein R_1 through R_6 may be the same or different and may be hydrogen or a branched, cyclic, or straight chained, saturated or unsaturated hydrocarbon having from 1 to about 6 carbon atoms.

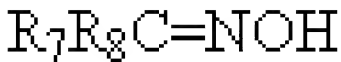
[c17] The method of claim 16 wherein the carbonylhydrazide is carbonylhydrazide wherein R_1 through R_6 are each hydrogen.

[c18] The method of claim 16 wherein the semicarbohydrazide is semicarbohydrazide wherein R_1 through R_5 are each hydrogen.

[c19] The method of claim 15 wherein the source of the hydroxylamine is selected from the group consisting of a aldoximes having the formula



and ketoximes having the formula



wherein R_7 and R_8 may be the same or different and may be a branched, cyclic, or straight chained, saturated or unsaturated hydrocarbon having from 1 to about 8 carbon atoms and further wherein R_7 and R_8 may form a ring.

[c20] The method of claim 19 wherein the source of the hydroxylamine is selected from the group consisting of 2-butanone oxime, methyl isobutyl ketoxime, cyclohexanone oxime, acetaldoxime, butyraldoxime, propionaldoxime, heptaldoxime, 3-heptanone oxime, and acetophenone oxime.

[c21] The method of claim 20 wherein the source of the hydroxylamine is 2-butanone oxime.